AGENDA ITEM K-02

# CITY OF LODI
# COUNCIL COMMUNICATION

**AGENDA TITLE:** **Approve Staff Recommendation for Preferred Site Selection for the Lodi Surface Water Treatment Facilities**

**MEETING DATE:** **August 15, 2007**

**PREPARED BY:** **Public Works Director**

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**RECOMMENDED ACTION**: Approve the staff recommendation for the preferred site selection for the Lodi Surface Water Treatment Facilities.

**BACKGROUND INFORMATION**: At the April 4, 2007 Council meeting, a professional services contract was awarded to HDR, Inc., of Folsom, to prepare the Surface Water Treatment Feasibility Conceptual Design and Feasibility Evaluation for Water Supply and Transmission. An important element of this contract was the consideration of five alternative sites with the objective to receive Site Selection direction from the City Council early in the program. By selecting the preferred site early in the program, it allows for a focused evaluation of the single site instead of multiple sites.

Initial screening of the five alternative sites has been completed, and Site A is recommended as the preferred site. The five alternative sites (as shown on Exhibit 1) were:

A – The vacant 13 acres at the west side of Lodi Lake
B – The General Mills orchard property west of Site A
C – The "scenic overlook" site at the end of Awani Drive at the Mokelumne River
D – Along the Woodbridge Irrigation District (WID) Canal, 0.6 miles northwest of the corner of Lower Sacramento Road and Sargent Road (immediately west of the proposed Westside residential development project)
E – Along the WID canal, just north of Turner Road

A complete copy of the Draft Technical Memorandum 1 – Alternative Site Selection – Initial Screening (TM 1) is provided as Attachment A. A summary of TM 1 is provided below.

The screening criteria applied to each of the alternative sites are listed below:

1. Sufficient Size of Site (minimum 5 acres) – Membrane filtration or conventional treatment plant have been assumed.
2. Flooding Hazard and Flooding Protection – Each site is assumed to be modified to a 500-year flood protection condition. Costs vary.
3. Water Quality – Each site has similar characteristics, except Site C that is superior to all.
4. Environmental Permitting Issues – The primary environmental differentiator is the requirement for a new river intake at Site C, which would be costly and difficult to permit.
5. Costs Including Piping to the Site and Site-Specific Improvement Costs

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APPROVED: _____
Blair King, City Manager

6. Educational Opportunities – Visitor center/river education center
7. Aesthetic Compatibility with Surrounding Area

Site A ranked highest or near-highest in the categories of Sufficient Size, Environmental Permitting, Pipeline Costs, Site Improvement Costs, Educational Benefits, and Aesthetic Compatibility. Although Site B ranked high along with Site A, the site acquisition costs associated with Site B lowered its ranking. Site A requires approximately two feet of fill to provide 500-year flood protection. Site C is not recommended for further consideration for Site Size and Environmental considerations.

At its August 7, 2007 meeting, the Lodi Parks and Recreation Commission voted (4-1) to support the Site A concept. The Commission had a number of concerns and suggestions:

- That the Parks & Recreation staff, the Commission and the public be involved in the overall site design
- That the aesthetics of the project fit well within Lodi Lake Park
- That the project provide some Park benefit to mitigate the loss of land that has been planned for future park development

Public Works staff concurs with these points and looks forward to assisting in the improvement of this land that has been vacant since its purchase in 1957, should the City Council approve the staff recommendation.

"Next steps" in this project process will be to refine the site layout and the treatment technology (which includes the watershed assessment), geotechnical work, evaluation of environmental considerations, distribution system modification evaluation and phasing/cost estimates. Staff hopes to be ready to start final design in less than eighteen months in order to have a functioning facility in the 2010/11 time frame.

**FISCAL IMPACT**: Site A is the recommended site for the Surface Water Treatment Facility and could realize a reduced capital expenditure in excess of $1,000,000.

**FUNDING AVAILABLE**: Not applicable.

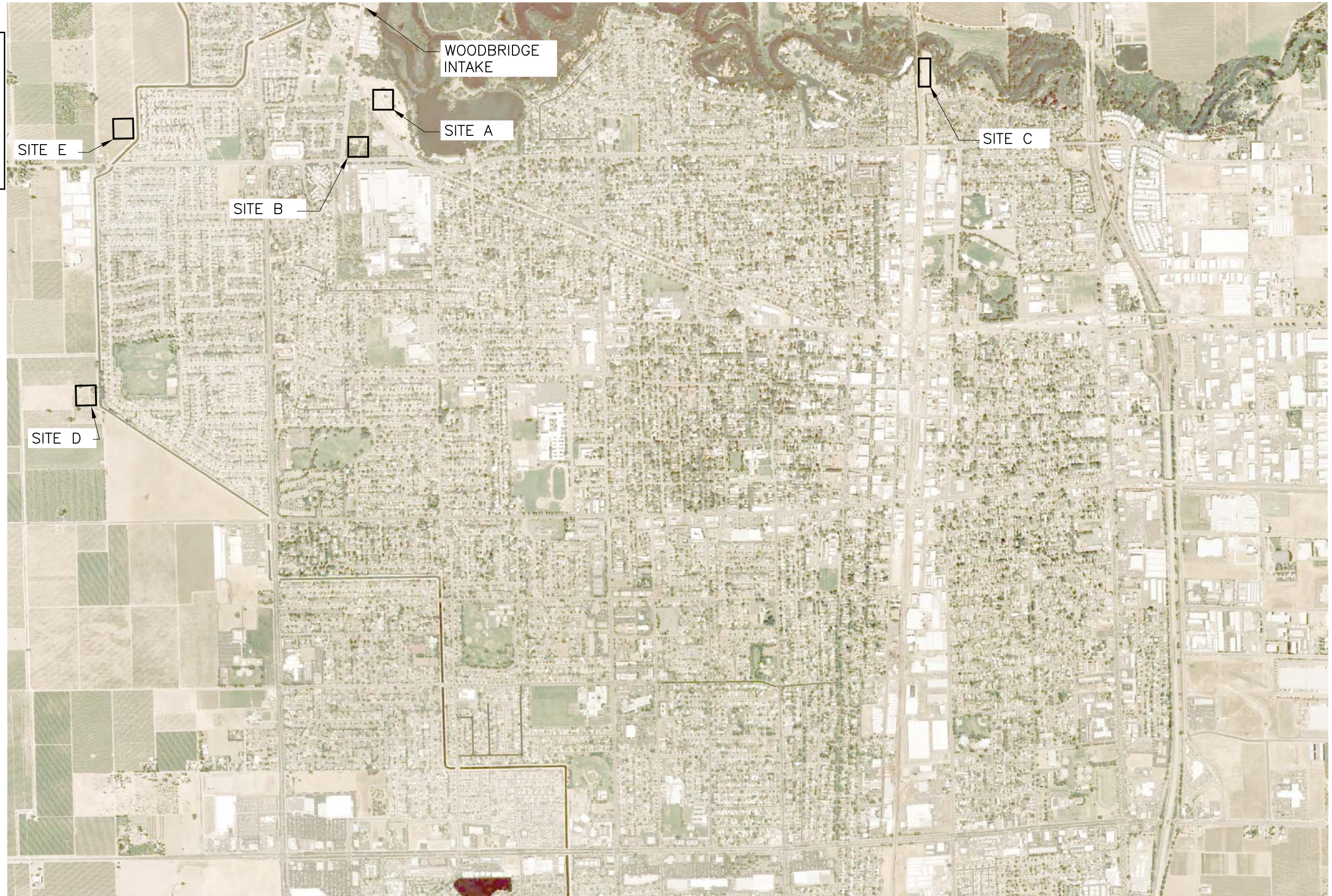
Richard C. Prima, Jr.
Public Works Director

Prepared by F. Wally Sandelin, City Engineer/Deputy Public Works Director

RCP/FWS/pmf

Attachment

**Exhibit 1**

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1" = 120'

0 120' 240'

HDR

**ALTERNATIVE SWTF SITE LOCATIONS**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

DATE
6/19/07

FIGURE
1

# TM 1 – ALTERNATIVE SITE SELECTION – INITIAL SCREENING

***City of Lodi Surface Water Treatment Facility Conceptual Design and Feasibility Evaluation***

***July 30, 2007***

Reviewed by: Richard Stratton, P.E.

Prepared by: Shugen Pan, PhD, P.E.

## Introduction

The City of Lodi (City) contracted with HDR and WYA to develop a conceptual design and feasibility evaluation of alternatives for a nominal 12 million gallon per day (mgd) surface water treatment facility (SWTF), storage facilities and distribution system improvements. As part of the project, the City wishes to evaluate the feasibility of surface water treatment at five potential sites as shown in Figure 1. The 12 mgd capacity of the SWTF is needed to have sufficient flexibility to fully utilize the City's 6,000 acre-feet per year water purchase from Woodbridge Irrigation District (WID). The WID water currently can only be used during the period March 1 through October 15. The 12 mgd plant capacity allows for satisfying peak demands during the summer plus providing the ability to treat carryover water storage or potential surplus during wet years. The City identified four of the potential sites and gave the consultant the option of identifying one more site to be included in a screening process. The initial screening will establish the selection criteria and present preliminary findings and recommend the preferred site(s). A detailed evaluation of selected site including water system modeling of the needed piping to convey water to the distribution system, detailed analysis of needed site improvements, and a layout of the SWTF on the selected site will be presented in a separate TM.

## Criteria for Initial Site Screening

The purpose of the initial site screening is to identify preferred sites for the SWTF and eliminate inferior sites from further evaluation. The following initial criteria will be used to screen the sites. Additional criteria may be added based on input from the City.

- Sufficient size of site (at least 5 acres need).
- Flooding hazard.
- Environmental issues (Significant environmental impacts).

- Pipe line costs (raw water pipe line from intake to SWTF and treated water pipe line from SWTF to distribution tie in). Preliminary costs based on current information are used for this initial comparison. These costs will be refined after hydraulic modeling is performed.

- Site Improvement Costs (including land procurement, site access improvements, drainage facilities, and flood protection features).

- Other Benefits (use of facilities by public for educational purposes)

- Aesthetic compatibility with the surrounding land uses

## Potential SWTF Sites

The following five potential sites have been identified for the SWTF. The sites are shown in Figure 1.

Site A – Lodi Lake site (City owned).

Site B – General Mills site - This site is adjacent to site A to the west across the railroad tracks.

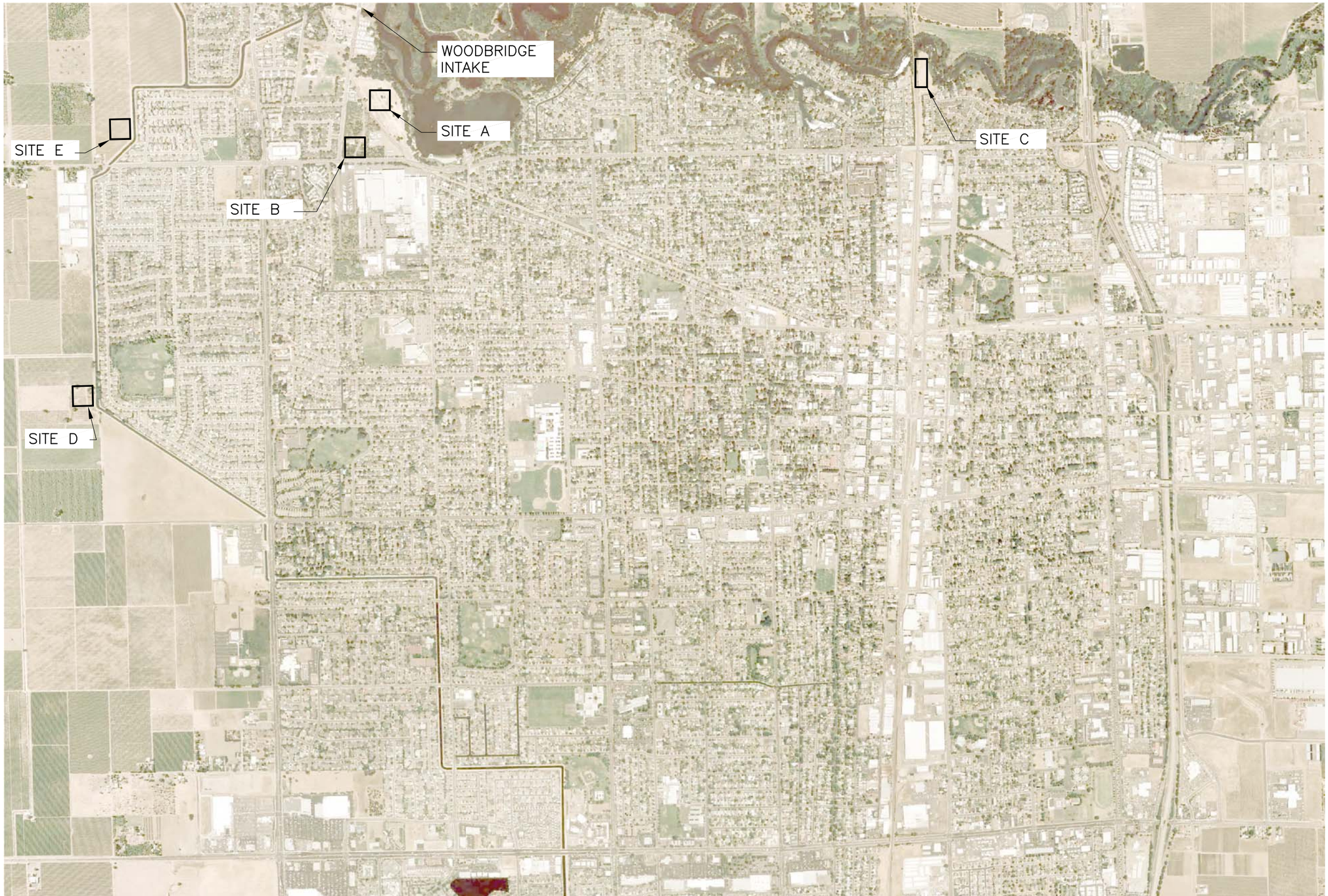
Site C – Old landfill site at the end of Awani Drive along the Mokelumne River (City owned).

Site D – Along Woodbridge Irrigation District (WID) canal 0.6 mile northwest of corner of Lower Sacramento Drive and West Sargent Rd. This site is adjacent to proposed future development.

Site E – Along the WID canal just north of Turner Road.

Sites A through D are identified by the City as potential SWTF sites. Site E was identified by HDR as an additional potential site. This site was picked because it is along the WID Canal alignment, and is existing farm land located near the west side of the City's water distribution system.

In order to determine the acreage of land needed for the SWTF, design criteria for both conventional and membrane treatment processes are developed (covered in detail in a separated TM). Preliminary flow schematics for conventional treatment and membrane filtration are shown in Figures 2 and 3, respectively. Conceptual layouts for conventional treatment and membrane treatment are presented in Figures 4 and 5, respectively.

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1" = 120'

0 120' 240'

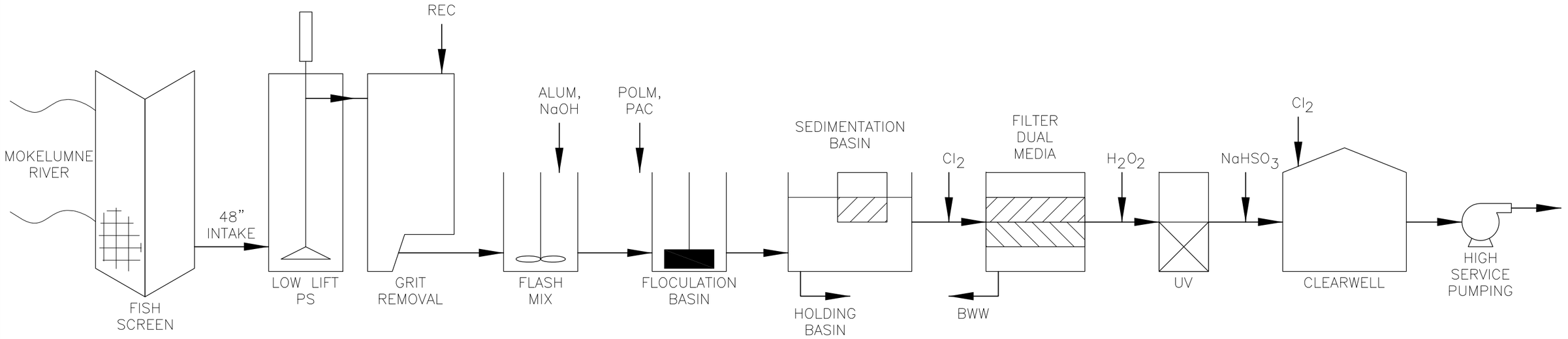
HDR

**ALTERNATIVE SWTF SITE LOCATIONS**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

DATE
6/19/07

FIGURE
1




# CONVENTIONAL TREATMENT

1

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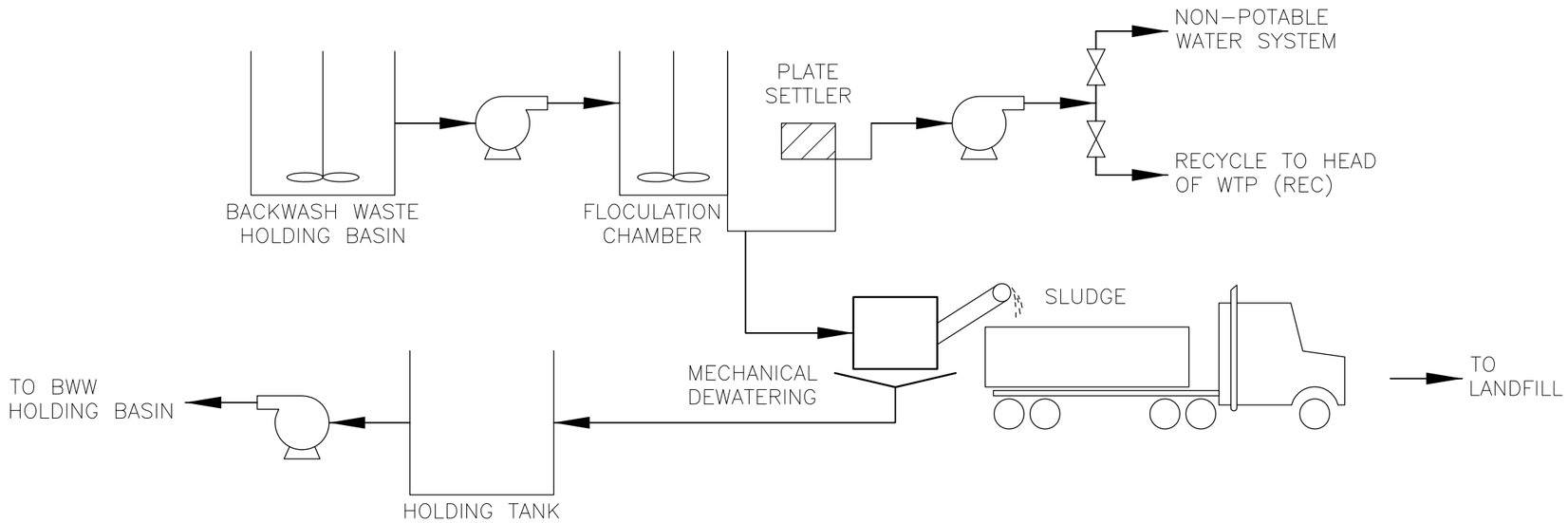


# CONVENTIONAL WTP SOLIDS HANDLING

2

SCALE: NONE

HDR

**FLOW SCHEMATIC**
**CONVENTIONAL TREATMENT**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

**DATE**
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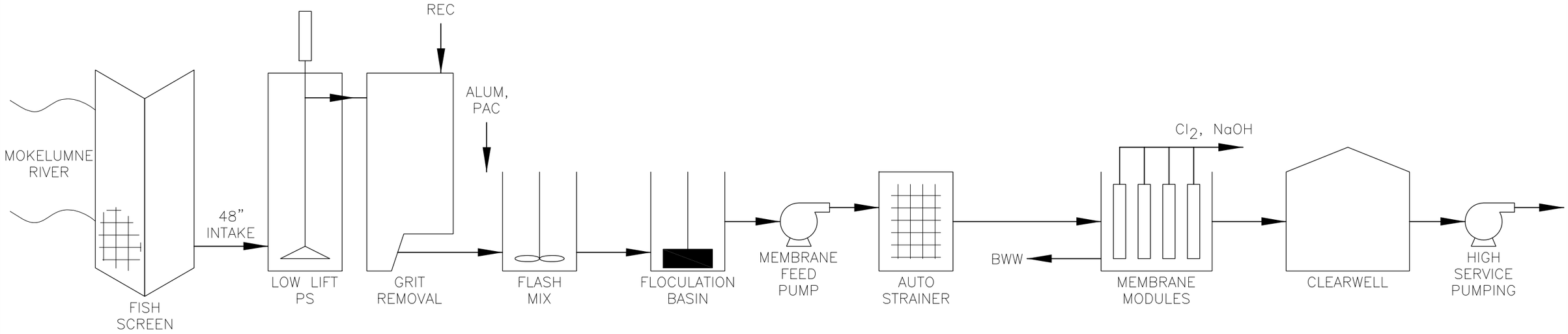
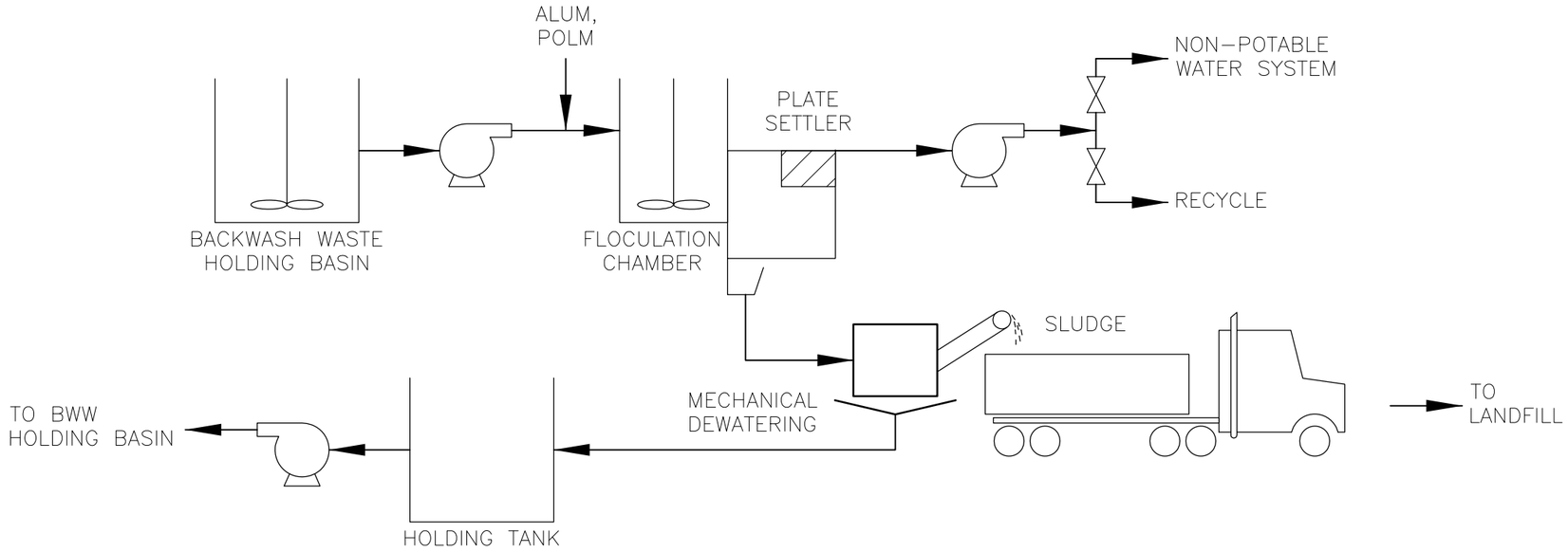
**FIGURE**
2




## MEMBRANE TREATMENT

SCALE: NONE

1 / –




## MEMBRANE SOLIDS HANDLING

SCALE: NONE

2 / –

HDR

**FLOW SCHEMATIC**
**MEMBRANE TREATMENT**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

DATE
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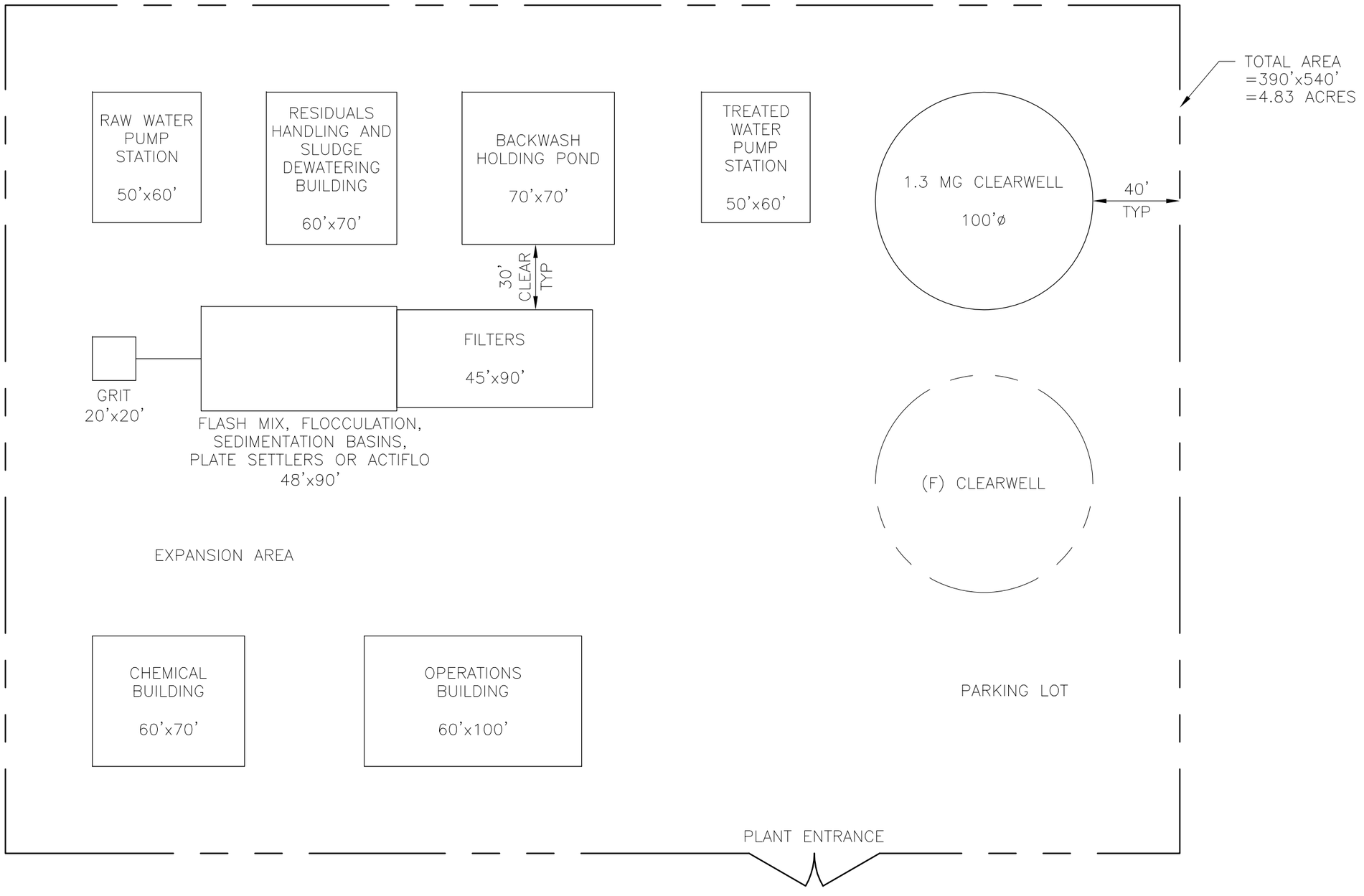
FIGURE
3




# PLANT LAYOUT

SCALE: 1"=50'

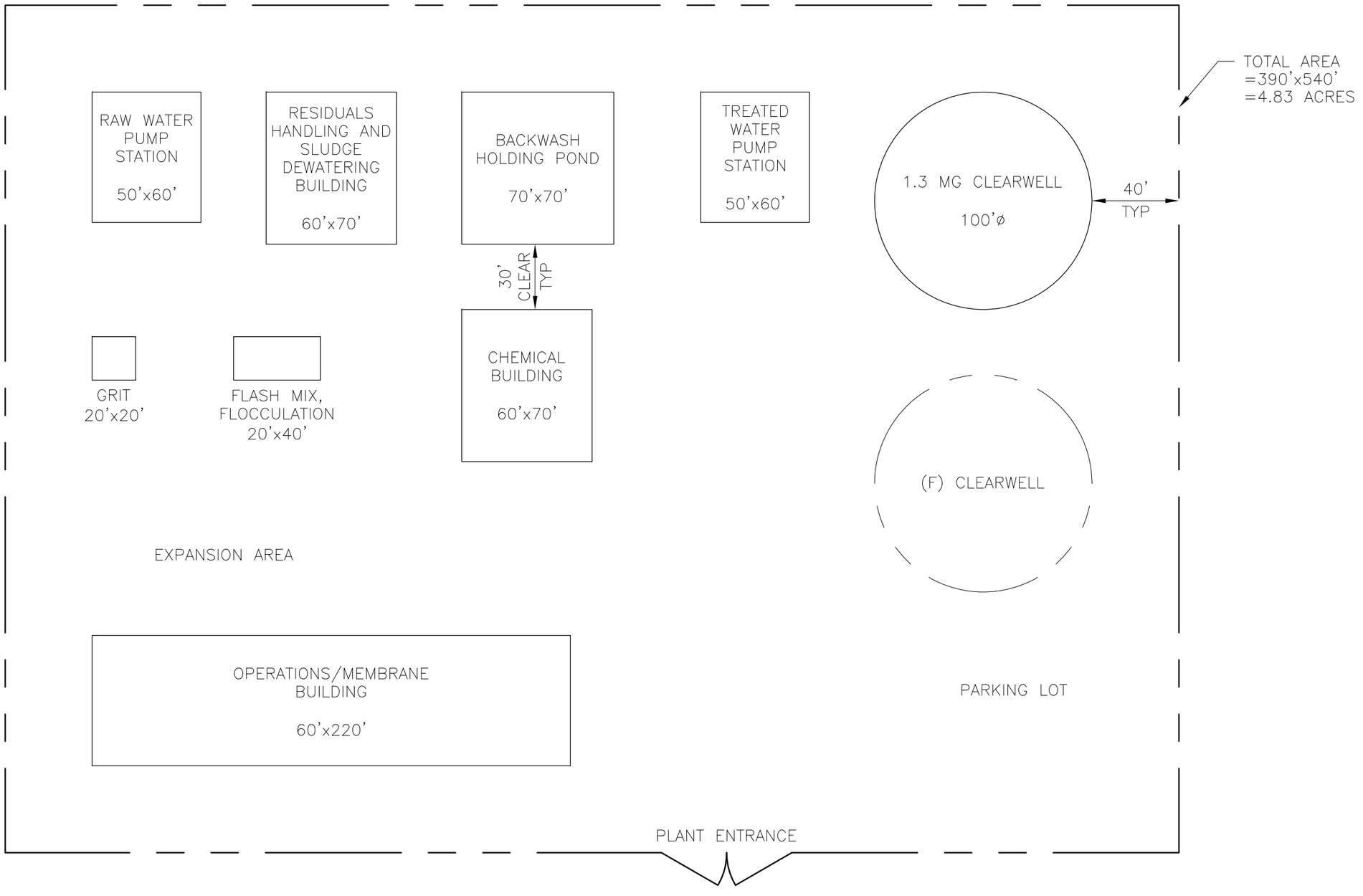
HDR

**PLANT LAYOUT**
**CONVENTIONAL TREATMENT**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

**DATE**
6/19/07

**FIGURE**
4




# PLANT LAYOUT

SCALE: 1"=50'

HDR

**PLANT LAYOUT**
**MEMBRANE TREATMENT**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

**DATE**
6/19/07

**FIGURE**
5

In order to accommodate the 12 mgd ultimate capacity of the treatment plant, a minimum plant site size of 5 acres is recommended. This will provide sufficient space for either conventional treatment or membrane treatment facilities and allow for efficient site planning and possible future additions to the treatment facility. If practical, additional site area would be desirable to provide a wide landscaping buffer along the perimeter buffer to mitigate noise and visual impacts.

## Preliminary Evaluation

The preliminary screening matrix for the alternative sites is presented in Table 1. A comparison of the costs for each site is summarized in Table 2. Assumptions used for the cost comparison are as follows:

- Land acquisition costs are based on an initial estimate of $200,000 per acre based on information from the City. For cost comparison, a total sire area of 5 acres of land is assumed.

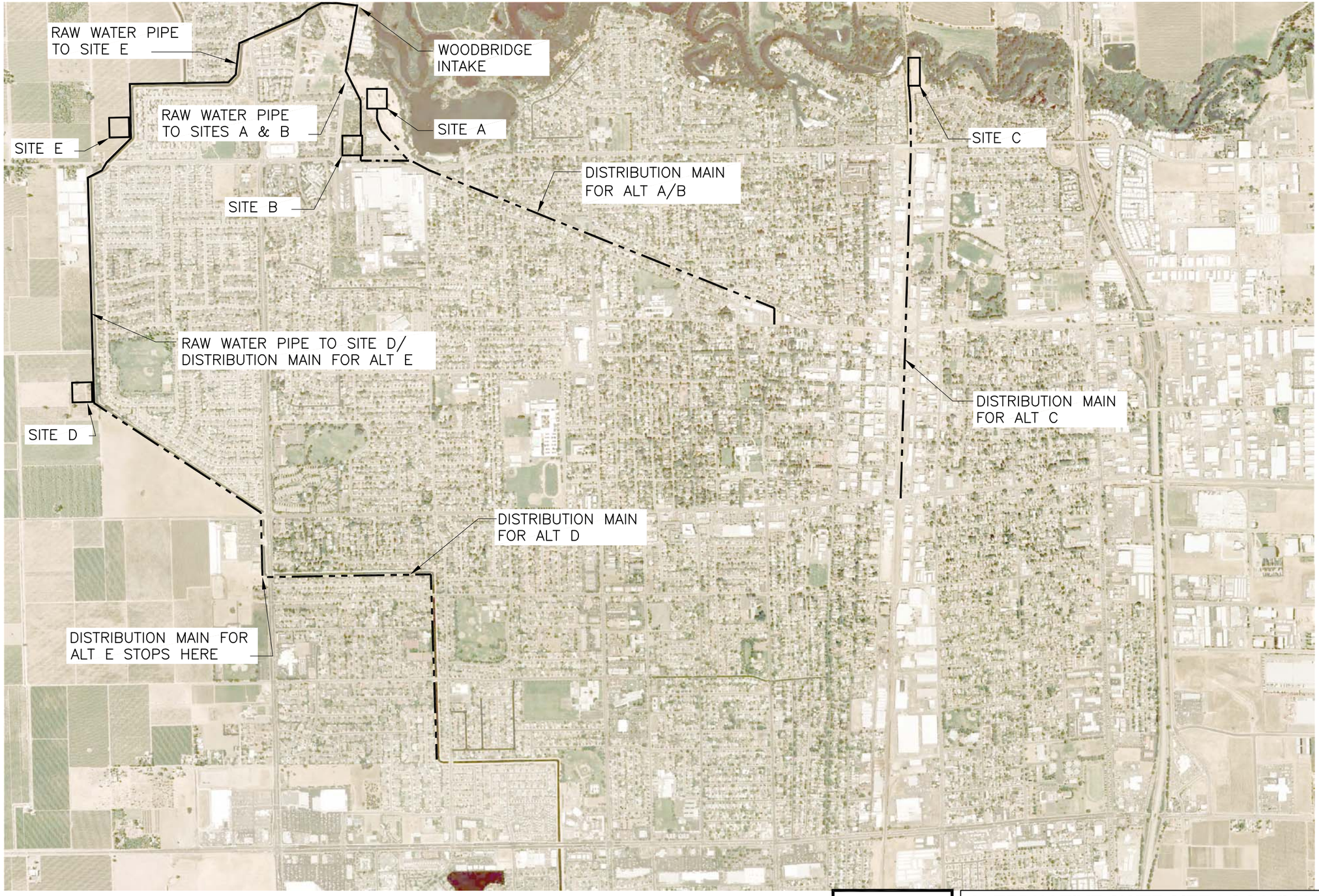
- Pipeline costs, including the raw water pipeline to the SWTF and treated water main from the SWTF to the City's distribution system. The raw water and treated water main routing for each alternative is shown in Figure 6. These preliminary alignments are based on information in the Technical Memorandum -Preliminary Planning for Water Distribution System Expansion (RMC - November 2, 2006).

- Site improvement costs: Preliminary costs are based on raising the grade of the sites in the flood plain to 1.5 feet above the 100 year flood level. Costs also include an access road or driveway from the nearest available road onto the site.

- Additional Improvements: Due to the long distance of Site C from the new WID canal intake facility, the cost of a new river intake structure is included for Site C. In addition, because of potential poor soils in the land fill, it is assumed that all of the structures at Site C would be built on piles. The cost of piles is included with the other costs for this site.

- The cost of the water treatment facility is the same for each alternative and is not included in the comparison.

- Operating costs will be similar for each site and are not considered for this initial screening. (Although more pumping costs are expected for alternatives with longer pipelines, these costs are considered covered in the pipeline costs)

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LEGEND:

— RAW WATER PIPE

—·—·— DISTRIBUTION MAIN

HDR

**ALTERNATIVE SWTF SITE LOCATIONS**
**RAW WATER AND TREATED WATER ROUTING**

CITY OF LODI – SURFACE WATER TREATMENT FACILITY

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6/19/07

FIGURE
6

**Table 1 Preliminary Screening of SWTF Alternative Sites**

| Site Alternative | Site A | Site B | Site C | Site D | Site E |
|---|---|---|---|---|---|
| **Available Space** | 13.0 ac owned by City, more than sufficient. | 8.9 ac owned by General Mills with no plans to sell, sufficient. | 3.0 ac owned by City, additional land may be available from the railroad company. | 8.6 ac owned by private party, sufficient. | > 5 ac available from private party, sufficient |
| **Flood Hazard** | Currently in FEMA 500-year flood zone. The site elevation is also lower than the 100 year water surface elevation at of 44.5 based on the 1987 FEMA Flood Insurance Map. | Same as Site A | Currently in 500-year flood zone. | Currently falls outside of the 100-year or 500-year flood zones. | Currently in FEMA 500-year flood zone. |
| **Water Quality** | • Water source is existing WID intake.<br>• Urban drainage enters the river upstream of the WID intake.<br>• Water body contact recreation in Lodi Lake upstream of intake. | Same issues as for Site A. | Upstream of most urban run-off and Lodi Lake | Same issues as for Site A. | Same issues as for Site A. |
| **Environmental Permitting Issues** | The SWTF will need to be compatible with the Lodi Lake Park Master Plan. | | • This site would require a new Mokelumne River Intake that would be difficult to | | |

| | | | | | |
|---|---|---|---|---|---|
| | | | permit<br>• Clean-up of the old landfill may be required prior to constructing any new facilities<br>• Access to the site is through a residential neighborhood | | |
| **Required Pipelines** | The total length of raw water line from the WID intake at Woodbridge is about 3,000 feet. The treated water distribution main is about 7,000 feet based on preliminary evaluation of the City's distribution system. | The total length of raw water line from the new WID intake at Woodbridge is about 3,500 feet. The treated water distribution main is about 7,000 feet based on preliminary evaluation of the City's distribution system. | A new intake will need to be constructed at the site. It is impractical to use the WID intake at Woodbridge 13,800 feet away. The treated water distribution main is about 9,000 feet based on preliminary evaluation of the City's distribution system. | The total length of raw water line from the new WID intake at Woodbridge is about 12,000 feet. The treated water distribution main is about 9,000 feet based on preliminary evaluation of the City's distribution system. | The total length of raw water line from the new WID intake at Woodbridge is about 7,800 feet. The treated water distribution main is about 9,000 feet based on preliminary evaluation of the City's distribution system. |
| **Required Site Improvements** | • Access road from Turner Road onto the south end of the site (including a rail road crossing) and roadway to the north side where | • Purchase minimum 5 acres of land.<br>• Access road from Lower Sacramento | • Purchase of additional 2 acres of land in a developed area (land may not be available)<br>• Access road from | • Purchase minimum 5 acres of land.<br>• Access road from the Lower | • Purchase of minimum 5 acres of land.<br>• Access road from the Tuner Road |

| | | | | | |
|---|---|---|---|---|---|
| | SWTF would be located.<br>• Fill to bring SWTF above the 100-year flood elevation | Road onto the site.<br>• Fill to bring SWTF above the 100-year flood elevation. | Awani Drive onto the site.<br>• Piles in building areas.<br>• A new intake at site. | Sacramento Road onto the site (the costs for this item could possibly shared with the planned housing development) | onto the site. |
| **Other Benefits** | Part of the operations building could include an education for Lodi Lake and Mokelumne River environmental topics and water supply and treatment.<br>Would jump start park development. | | | Outside urban area. | Outside urban area. |
| **Aesthetic Compatibility with Surrounding Area** | View of the Lodi Lake, can blend well with the educational uses of the area. | Fits in with industrial uses, but not educational uses. | View of the Mokelumne River, however, not compatible with residential area. | May not blend well with new developments. | On edge of town. May not blend well with new developments. |

**Table 2 SWTF Site Alternatives Cost Comparison Summary***

| Site Alternative | Pipeline costs | Required Site Improvements | Site Acquisition | Total cost |
|---|---|---|---|---|
| Site A | $3,600,000 | $765,000 | $0 | $4,365,000 |
| Site B | $3,780,000 | $705,000 | $1,000,000 | $5,485,000 |
| Site C | $3,240,000 | $4,560,000 | $400,000 | $8,200,000 |
| Site D | $7,560,000 | $400,000 | $1,000,000 | $8,960,000 |
| Site E | $6,048,000 | $60,000 | $1,000,000 | $7,108,000 |

*Note: Details of pipeline and site improvement costs for alternatives are included in Appendix A

## Preliminary Findings and Recommendations

Based the site alternatives cost presented in Table 2, Site A has the lowest cost with the order of the alternative costs from the lowest to the highest being: Site A, Site B, Site E, Site C, and Site D.

Raw water pipeline cost is the most influential factor because of the significant differences in raw water pipeline length among the potential site alternatives. The treated water pipeline costs are similar among all the alternatives because all the alternative SWTF sites are fairly close to the perimeter of the existing distribution system and the treated water main can connect with the distribution system from all directions.

Major site improvement costs differ among different alternatives. Site C will need most site improvement including piles and a new intake structure. Site A, Site B, and Site E will require similar improvements to provide access and to do grading to ensure good drainage. Major Site improvement cost for Site D is the long access road (this cost could possibly be shared with the planned housing development).

Land acquisition is needed for all alternatives except Site A. Land is expected to be available for purchase at all sites except for Site C, which is in a developed residential area.

Environment impacted is not expected to be significant for all alternatives except Site C unless results of the under going environmental evaluation shows otherwise. Site C will require a new intake on the Mokelumne River which will be very difficult to permit.

The difference between Site A and Site B is that the City owns site A, but not site B. The cost difference of these two sites is primarily due to the land acquisition cost for site B. In addition, Site A has the advantage of incorporating educational and recreational facilities into the SWTP due to its proximity to the Lodi Lake. Ideally, the existing Discovery Center in the park can be upgraded, expanded and incorporated into the SWTF.

The aesthetic compatibility with surroundings is best for Site A because of proposed educational elements and public facility elements. The SWTF would seem out of place at all of the other sites.

Preliminary recommendations based on the initial screening are as follows:

- The recommended site for SWTF is Site A.
- If the under going environmental evaluation shows significant impact of the recommended alternative (Site A), the order of back up alternatives will be: Site B, Site E, and Site D.

- Eliminate Site C from further consideration because of the potentially high costs of dealing with the old landfill and the difficult permitting issues associated with a new intake.

- Perform more detailed evaluation on the selected site include water system modeling of the needed piping to convey water to the distribution system, detailed analysis of needed site improvements, and development of a layout of the SWTF on the site (in a separate TM).

Appendix A

# Pipeline and Site Improvement Cost Breakdown

Table A-1 Raw Water and Distribution Main Costs for Alternative Plant Sites

| Alternative Sites | Raw Water Line | | Distribution Main | | Total Cost |
|---|---|---|---|---|---|
| | Length (ft) | Cost | Length (ft) | Cost | |
| Site A | 3000 | $1,080,000 | 7000 | $2,520,000 | $3,600,000 |
| Site B | 3500 | $1,260,000 | 7000 | $2,520,000 | $3,780,000 |
| Site C | | $0 | 9000 | $3,240,000 | $3,240,000 |
| Site D | 12000 | $4,320,000 | 9000 | $3,240,000 | $7,560,000 |
| Site E | 7800 | $2,808,000 | 9000 | $3,240,000 | $6,048,000 |

Assumptions:
1) 24 IN pipeline is assumed for raw water line and treated water distribution main.
2) Unit cost for 24 IN pipe is assumed to be $360/foot ($15/Inch.foot) for cost comparison purposes.

Table A-2 Site Improvement Costs for Alternative Plant Sites

| Alternative Sites | Fill Feet | Quantity (CY) | Fill Cost ($ 20) | Access Road (Feet) | Road Cost ( $ 200 ) | New Intake and Piles | Total Cost |
|---|---|---|---|---|---|---|---|
| Site A | 4 | 32,267 | $645,000 | 600 | $120,000 | | $765,000 |
| Site B | 4 | 32,267 | $645,000 | 300 | $60,000 | | $705,000 |
| Site C | 0 | | | 100 | $20,000 | $4,540,000 | $4,560,000 |
| Site D | 0 | | | 2000 | $400,000 | | $400,000 |
| Site E | 0 | | | 300 | $60,000 | | $60,000 |

Assumptions:
1. Cost is based on a 5-acre plant site.
2. Fill depth is based on raising the site elevation to 1.5 feet above the 100-year flood elevation.
3. Access road length is the minimum from the available road onto the plant site.
4. At site C, 1 pile is assumed for every 25 square feet at $200; cost of new intake $3,500,000.